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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR  | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|-----------------------|---------------------|------------------|
| 10/032,798      | 12/26/2001  | Christoph Georg Erben | 1-6-43-2            | 7214             |

7590 06/18/2003

Docket Administrator (Room 3J-219)  
Lucent Technologies Inc.  
101 Crawfords Corner Road  
Holmdel, NJ 07733-3030

EXAMINER

VALENTIN, JUAN D

ART UNIT PAPER NUMBER

2877

DATE MAILED: 06/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                    |              |
|------------------------------|--------------------|--------------|
| <b>Office Action Summary</b> | Application No.    | Applicant(s) |
|                              | 10/032,798         | ERBEN ET AL. |
|                              | Examiner           | Art Unit     |
|                              | Juan D Valentin II | 2877         |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-15 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) 16-20 are subject to restriction and/or election requirement.

**Application Papers**

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) All b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 & 4.
- 4) Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_

**DETAILED ACTION**

***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1-15, drawn to an optical modulator, classified in class 385, subclass 1.
  - II. Claims 16-20, drawn to a method of electro-optically modulating an optical carrier wave with a control wave, classified in class 385, subclass 2.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used to practice another and materially different process such as adjusting the differential delay line operative for compensating for variable first-order Polarization Mode Dispersion.

3. During a telephone conversation with John F. McCabe on 13 June 2003 a provisional election was made with traverse to prosecute the invention of group I, claims 1-15. Affirmation of this election must be made by applicant in replying to this Office action. Claims 16-20 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

*Drawings*

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: Reference 85 in Figs. 5A and 5B is not mentioned in the specification. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

*Specification*

5. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Claims 2, 14, & 15 claim specific cladding to core refractive index ratios, yet the specification (page 12, line 7) only discloses that higher ratios “enables control waves to produce stronger electric fields in the optical waveguides”. The claimed subject matter must be disclosed within the specification in order to provide proper antecedent basis.

*Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1 and 8 rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural

cooperative relationships are: The structural relationship between the optical waveguide and control waveguide of both claims one and eight do not give patentable weight to the third paragraph of either claim. Paragraph three in each claim is a function that is not supported because there is no structural relationship given in the claims showing how the optical and control waveguides work together. Claims 1 and 8 will be examined to the best of the Examiners understanding of the claimed invention and without regard for the limitations contained within the third paragraph of each claim.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 3, 4, 7-11, & 13 rejected under 35 U.S.C. 102(b) as being anticipated by Hallemeier et al. (USPN '855 B1, hereinafter Hallemeier).

**Claim 1**

Hallemeier discloses in conjunction with Figs. 1 & 3, an optical modulator (24) comprising an optical waveguide (28 & 26) that includes a cladding layer (buffer layer, 76) and a core (58 & 60) for carrying an optical carrier wave. Hallemeier discloses a control waveguide (34 & 36) for carrying a control wave, the waveguides being collinear and the optical waveguide having a refractive index that is responsive to electric fields produced by the control wave (col. 6, lines 11-52 & col. 7, lines 49-60). It is inherent within the reference that there is a control

waveguide, in order for a control signal to modulate light it must pass through some form of waveguide.

**Claim 3**

Hallemeier further discloses an optical modulator wherein the refractive index of the core at a wavelength in the range of about 1.3 microns to about 1.7 microns is lower than the refractive index of the cladding layer at a frequency at one of a microwave's wavelength, a millimeter wave's wavelength, and a sub millimeter wave's wavelength (col. 5, line 66-col. 6, line 2 & col. 7, lines 49-60). It is implicit within the reference that refractive index of a substance is equal to the square root of its dielectric constant and radio frequencies are in the range of about 100 cm., therefore Applicant will be appreciated that the reference of Hallemeier reads on the claimed limitations.

**Claims 4 & 11**

Hallemeier further discloses an optical modulator wherein the cladding layer includes an organic polymer (col. 7, line 60-col. 8, line 10).

**Claim 7**

Hallemeier further discloses in conjunction with Figs. 1 & 3, an optical modulator comprising a Mach-Zehnder interferometer (24), the interferometer comprising an optical waveguide (26) for carrying the first optical carrier wave and a second optical waveguide (28) configured to transmit a second optical carrier wave that is mutually coherent with the first optical carrier wave (col. 6, lines 11-52).

**Claim 8**

Hallemeier discloses in conjunction with Figs. 1 & 3, an optical modulator (24) comprising an optical waveguide (28 & 26) that includes a cladding layer (buffer layer, 76) and a

core (58 & 60) for carrying an optical carrier wave. Hallemeier discloses a control waveguide (34 & 36) for carrying a control wave, the waveguides being collinear and the optical waveguide having a refractive index that is responsive to electric fields produced by the control wave (col. 6, lines 11-52 & col. 7, lines 49-60). It is inherent within the reference that there is a control waveguide, in order for a control signal to modulate light it must pass through some form of waveguide.

**Claim 9**

Hallemeier further discloses an optical modulator wherein the refractive index of the cladding layer, at the control wave's wavelength, is higher than the refractive index of the core at, the optical carrier wave's wavelength (col. 5, line 66-col. 6, line 2 & col. 7, lines 49-60). It is implicit within the reference that refractive index of a substance is equal to the square root of it's dielectric constant and radio frequencies are in the range of about 100 cm., therefore Applicant will be appreciated that the reference of Hallemeier reads on the claimed limitations.

**Claim 10**

Hallemeier further discloses an optical modulator wherein the refractive index of the core is lower than the refractive index in the cladding at one of a microwave's wavelength, a millimeter wave's wavelength, and a sub millimeter wave's wavelength (col. 5, line 66-col. 6, line 2 & col. 7, lines 49-60). It is implicit within the reference that refractive index of a substance is equal to the square root of it's dielectric constant and radio frequencies are in the range of about 100 cm., therefore Applicant will be appreciated that the reference of Hallemeier reads on the claimed limitations.

**Claim 13**

Hallemeier discloses in conjunction with Figs. 1 & 3, an optical modulator (24) comprising an interferometer having two optical waveguides (26 & 28) with associated cores (58 & 60), one of the cores having a refractive index that is responsive to applied electric fields (col. 6, lines 10-52). Hallemeier discloses a pair of electrodes (54 & 56) extending parallel to the one of the cores and a cladding (buffer, 76) disposed between the one of the cores and the electrodes (col. 7, lines 49-60). Hallemeier discloses wherein the refractive index of the core at a wavelength in the range of about 1.3 microns to about 1.7 microns is smaller than the refractive index of the cladding layer at a frequency at one of a microwave's wavelength, a millimeter wave's wavelength, and a sub millimeter wave's wavelength (col. 5, line 66-col. 6, line 2 & col. 7, lines 49-60). It is implicit within the reference that refractive index of a substance is equal to the square root of its dielectric constant and radio frequencies are in the range of about 100 cm., therefore Applicant will be appreciated that the reference of Hallemeier reads on the claimed limitations.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**8.** Claims 2, 14, & 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Hallemeier in view of Fjare et al. (USPN '045, hereinafter Fjare).

**Claim 2**

Hallemeier discloses the claimed invention except for the ratio of the refractive index of the cladding layer at a control wave's wavelength to the refractive index of the core at the optical carrier wave's wavelength is in the range of about 1.2 to about 1.05. Fjare teaches that it is known to adjust the refractive index of both core and claddings layers in order to achieve a desired refractive index ratio (col. 1, lines 55-58 & col. 3, lines 45-55). It would have obvious to one having ordinary skill in the art at the time the invention was made to adjust the refractive index of both core and claddings layers as taught by Fjare, since Fjare states at (col. 2, lines 53-61) that such a modification would help radiate significant amounts of optical power away from the waveguide.

Hallemeier in view of Fjare discloses the claimed invention except for the ratio of the refractive index of the cladding to the core being from a range of about 1.2 to about 1.05. It is inherent to someone of ordinary skill in the art at the time of the invention was made to find the optimum ratio of the refractive index between cladding and core, since it has been held that discovering an optimum value or workable range of a result effective variable involves only routine skill in the art.

#### **Claim 14**

Hallemeier discloses the claimed invention except for the ratio of a refractive index of the cladding at one of a microwave's wavelength, a millimeter wave's wavelength, and a sub millimeter wave's wavelength to a refractive index of the one of the cores at an optical carrier wave's wavelength is in the range of about 1.10 to about 1.15. Fjare teaches that it is known to adjust the refractive index of both core and claddings layers in order to achieve a desired refractive index ratio (col. 1, lines 55-58 & col. 3, lines 45-55). It would have obvious to one having ordinary skill in the art at the time the invention was made to adjust the refractive index

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of both core and claddings layers as taught by Fjare, since Fjare states at (col. 2, lines 53-61) that such a modification would help radiate significant amounts of optical power away from the waveguide.

Hallemeier in view of Fjare discloses the claimed invention except for the ratio of the refractive index of the cladding at one of a microwave's wavelength, a millimeter wave's wavelength, and a sub millimeter wave's wavelength to a refractive index of the one of the cores at an optical carrier wave's wavelength is in the range of about 1.10 to about 1.15. It is inherent to someone of ordinary skill in the art at the time of the invention was made to find the optimum ratio of the refractive index between cladding and core, since it has been held that discovering an optimum value or workable range of a result effective variable involves only routine skill in the art.

### **Claim 15**

Hallemeier discloses the claimed invention except for at one of a microwave's wavelength, a millimeter wave's wavelength, and a sub millimeter wave's wavelength, the ratio of the refractive index of the one of the cores to the refractive index of the cladding is less than one. Fjare teaches that it is known to adjust the refractive index of both core and claddings layers in order to achieve a desired refractive index ratio (col. 1, lines 55-58 & col. 3, lines 45-55). It would have obvious to one having ordinary skill in the art at the time the invention was made to adjust the refractive index of both core and claddings layers as taught by Fjare, since Fjare states at (col. 2, lines 53-61) that such a modification would help radiate significant amounts of optical power away from the waveguide.

Hallemeier in view of Fjare discloses the claimed invention except for at one of a microwave's wavelength, a millimeter wave's wavelength, and a sub millimeter wave's

wavelength, the ratio of the refractive index of the one of the cores to the refractive index of the cladding is less than one. It is inherent to someone of ordinary skill in the art at the time of the invention was made to find the optimum ratio of the refractive index between cladding and core, since it has been held that discovering an optimum value or workable range of a result effective variable involves only routine skill in the art.

9. Claim 5 rejected under 35 U.S.C. 103(a) as being unpatentable over Hallemeier in view of Kawachi et al. (USPN '767, hereinafter Kawachi).

**Claim 5**

Hallemeier substantially teaches the claimed invention except that it fails to show wherein the polymer that includes one of a polysilsesquioxane and P-O bonds. Kawachi shows that it is known to provide a polymer that includes one of a polysilsesquioxane and P-O bonds (col. 1, lines 38-52 & col. 2, lines 60-65) for an optical fiber. It would have been obvious to someone of ordinary skill in the art to combine the device of Hallemeier with the polymer that includes a P-O bond of Kawachi for the purposes of providing hastened deposition speed to result in low absorption losses (abstract).

10. Claim 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Hallemeier in view of Hayden et al. (USPN '658, hereinafter Hayden).

**Claim 6**

Hallemeier substantially teaches the claimed invention except that it fails to show wherein the core that includes one of PMMA and a dye. Hayden shows that it is known to provide a core that includes one of PMMA (col. 3, lines 20-36) for a non-linear polymeric fiber

waveguide. It would have been obvious to someone of ordinary skill in the art to combine the device of Hallemeier with the core that includes one of PMMA of Hayden for the purposes of providing waveguide properties which are utilized for the detection of radio frequency fields and modulating optical signals (abstract).

11. Claim 12 rejected under 35 U.S.C. 103(a) as being unpatentable over Hallemeier in view of Kawachi and further in view of Hayden.

**Claim 12**

Hallemeier substantially teaches the claimed invention except that it fails to show wherein the polymer that includes one of a polysilsesquioxane and P-O bonds. Kawachi shows that it is known to provide a polymer that includes one of a polysilsesquioxane and P-O bonds (col. 1, lines 38-52 & col. 2, lines 60-65) for an optical fiber. It would have been obvious to someone of ordinary skill in the art to combine the device of Hallemeier with the polymer that includes a P-O bond of Kawachi for the purposes of providing hastened deposition speed to result in low absorption losses (abstract).

Hallemeier in view of Kawachi substantially teaches the claimed invention except that it fails to show wherein the core that includes one of PMMA and a dye. Hayden shows that it is known to provide a core that includes one of PMMA (col. 3, lines 20-36) for a non-linear polymeric fiber waveguide. It would have been obvious to someone of ordinary skill in the art to combine the device of Hallemeier in view of Kawachi with the core that includes one of PMMA of Hayden for the purposes of providing waveguide properties which are utilized for the detection of radio frequency fields and modulating optical signals (abstract).

***Conclusion***

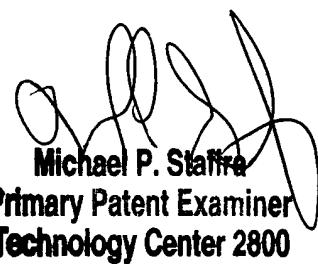
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan D Valentin II whose telephone number is (703) 605-4226. The examiner can normally be reached on M-Th., Every other Fr..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (703) 308-4881. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308- 0955.



Juan D Valentin II  
Examiner 2877  
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June 15, 2003



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